

Secret Allies: Reconsidering Science and Gender in *Cat's Eye*

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WHEN MARGARET ATWOOD PUBLISHED *CAT'S EYE*, readers intuited that Atwood was portraying a delicate negotiation between science and art. "The scientific imagination balances the mythic imagination," wrote Eleanor Cook in a review, "as in the two epigraphs, one from Hawking and one from a mythical Genesis." But when critical interpretations of science in the novel began to appear, that readerly intuition was challenged as some critics concluded that science was a negative force in the novel—an extension of an empiricist and racist patriarchy. Molly Hite, for example, calls the physicist character Stephen "a representative of the white, Western, male oppressor class" who suffers simultaneously from an "unawareness of the disciplinary system and of his own visibility within that system" (133, 147). June Deery writes, "Atwood concludes that what links science, imperialism, and patriarchy is control of the body.... Western scientists ... have traditionally been depicted as subduing nature as female.... They share some of the same attitude as colonists: conquer, map, know, and sell" (235). Susan Strehle suggests that the patriarchy is active in *Cat's Eye* in the strictest sense, attributing all forms of Elaine's suffering to "the fathers" in the novel who enact "hierarchies of value that place women at the bottom and girls below them." She identifies the "paternal authorities" as "home,

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church, school, and state” (170). She associates science with these paternal authorities, constructing “classical science” as the “scientific method of detached objectivity that denies women subjectivity” (162).

As a feminist and a teacher of this text in women’s literature and science and literature courses for over ten years, I have both felt myself, and noted in other readers, an emotional disconnect between readings that view science as oppressive and the portrayal of science and scientists in the novel. The three scientist characters in *Cat’s Eye*—Stephen, Elaine’s father Dr Risley, and his student-colleague Dr Banerji—all appear to be “classical scientists” who subscribe to the principles of empiricism, objectivity, and the scientific method. Yet they are not negative characters. In fact, these three scientists are muses for the artist-protagonist Elaine (Dr Banerji is called so explicitly), and science itself is a source of inspiration, for her as for them. The scientists are aesthetically driven in their work, and the scientific objects and ideas in the text (insects, stars, light, mirrors, and dimensions) become aesthetic objects in Elaine’s paintings.

Critics who read science and scientists as patriarchal and racist reference cultural critics like Michel Foucault, Sandra Harding, and Donna Haraway, who demonstrate how sexist and racist beliefs can be embedded in the scientific intellectual and methodological traditions, reinforcing Eurocentric and patriarchal agendas. These theories are immensely complex constructions of the interplay between science and culture, but they are vulnerable to oversimplification. When such ideas are reduced to interpretations that leave the reader thinking that (in the words of Deery’s editor, Harold Bloom) “scientific notions ... are masks for a supposedly male ideology” (vii), the subtlety of the critiques from social constructionists is lost. Leaving aside the question of what is a “male ideology,” these interpretations make the mistake of failing to distinguish between “professional science” and “cultural science” as defined by literary critic Daniel Cordle.¹ He defines professional science as “the set of practices

1 It would be too much of a digression here to discuss the various clashes of scientific ideals between select scientists and cultural theorists, but for a fair hearing of both perspectives readers are referred to Gould (95–104) and Cordle (45–72): a scientist and a literary theorist. As reactionary as attacks like *The Sokal Hoax*, *Higher Superstition* and *Intellectual Impostures* have been, Cordle reminds us that some replies from the postmodern camp can be equally unproductive. He warns that “vague denunciations” that “traditional” scientists that “do not ‘get’ their own cultural situatedness,” or that they are politically conservative, will fail if they don’t address the critique that “[the] science has ... been misunderstood and inappropriately deployed” (48–49). There is a significant amount of scholarship on the relationship between the sciences and the humanities; for a selection of sources representing both sides of the issue see: Brown, Hacking,

and expertise that make up the life of the working scientist” and cultural science as “the relationship between science and the public” (51). Atwood herself has repeatedly denied attributing social oppression to science *qua* science. She is careful to distinguish between science and what society *does with* or *to* science: “Science is a way of knowing, and a tool. Like all ways of knowing and tools, it can be turned to bad uses.... But it is not in itself bad. Like electricity, it’s neutral” (Interview n.p.). She is even more adamant in an article on the science fiction genre:

“Are you against Science?” I am sometimes asked. What a curious question. Against science, as opposed to what, and in favour of what? Without that thing we call “science,” a lot of us would be dead of smallpox, not to mention tuberculosis. But some readers have missed the point, anyway: it isn’t science that is bent on destroying the human race. The human race seems bent on destroying itself. (“My Life in Science Fiction” 161)

In *Cat’s Eye*, Atwood addresses issues pertaining to both professional science and cultural science, although she reserves the term “science” for the professional side; as in her interviews, cultural intersections with science are portrayed as intrusions into science’s inherent neutrality. Science, in *Cat’s Eye*, is portrayed as a resource for men, women, and artists.

Atwood does this without qualifying science or attempting to reconstruct it as something more amiable to social constructionism or cultural relativism, which means she takes a different tack than some of her readers, such as Deery, Strehle, or Martha Sharpe. These critics see quantum physics (the “new” physics) as a radical break from classical science, suggesting that it has abandoned the ideals of empiricism, objectivity, and the scientific method in favour of a radical subjective and relativistic vision of reality. But the implication that there is a significant methodological and ethical difference between the new physics and its precursors, which makes one feminist-relativist and the other not (neatly encapsulated in Deery’s section heading: “Quantum Women and Newtonian Men”) is refuted directly by scientists like Nobel-Prize-winning quantum physicist Steven Weinberg: “Quantum mechanics has been overwhelmingly important to physics,” he muses, “but I cannot find any messages for human life in quantum mechanics that are different in any important way from those of Newtonian physics” (76).

Harding, Livingston, Sokal and Bricmont, as well as a variety of opinions in the anthology *The Sokal Hoax*.

The language of quantum physics tempts us to conflate it with philosophical or ethical ideas: most obviously, “relativity,” “uncertainty,” “irrational,” and “imaginary.” The confusion of terminology concerned Bertrand Russell as early as 1925. He warned that the “subjectivity” of relativity is a “*physical* subjectivity, which would exist equally if there were no such things as minds or senses in the world ... The theory does not say that *everything* is relative; on the contrary, it gives a technique for distinguishing what is relative from what belongs to a physical occurrence in its own right” (133). Similarly, Werner Heisenberg warned against misapplying his mathematically determined concept of the Uncertainty Principle to “political” interpretations (his word). “[T]he incorrect statements published here and there in the enthusiasm about the new discoveries have caused all kinds of misunderstanding,” he wrote (167).

Such misunderstandings encourage “a premature conceptualization of the field as one concerned with relative and absolute truth,” warns modernist literature scholar Michael H. Whitworth (vii). Such conceptualizations are sometimes aligned with postmodern analyses, including some readings of *Cat’s Eye*. Strehle’s interpretation, for example, hinges on Heisenbergian terminology like “uncertainty,” leading her to conclude that experimental science is essentially “the same process of interpretation as the artist and the historian” and that it produces “a postmodern understanding of science” (“To the Beat” 215). Similarly, Deery suggests that there is a special sort of “science for feminists” which works against traditional empirical science and which can be aligned with postmodernism (236). While science and art certainly share some common interpretative challenges, as well as some aesthetics and ethical interests, to reinvent science as simply another culturally determined discourse is highly problematic.² Furthermore, as Atwood’s novel demonstrates, cultural critics, literary theorists, and artists can engage science on its own terms—without reconstructing a specific part of it to fit into a particular ideology—and still find enormous resources for literature, art, and society. While the developments in quantum science have been astounding, they are not necessarily the

2 Cordle, who describes his own work in the field of literature and science as a process of interpreting “a pattern of postmodern gestures” (8), explains: “By treating science as a discourse, [critics] make, by implication, sweeping claims about what science is and is not.... It is not sufficient to justify the cultural analysis of science by merely stating that it is a discourse, and then going on to treat it exactly the same as any other use of language (especially as the use of language discussed is more likely to be a popularization—and hence a translation—of the science, rather than the technical and mathematical incarnation of the science itself, used by expert practitioners in the field)” (50).

rupture implied by terms such as “postmodern science” (Strehle, “To the Beat” 210). Rather, Atwood represents the relationship between old and new science as a familial one: the classical scientist (Dr Risley) is the father of the new physicist (Stephen). Atwood, herself part of a scientific family, finds pride and inspiration in that lineage:

“People are sometimes surprised that the science in *Oryx and Crake* ... is more or less accurate. But why wouldn't it be? I grew up among the biologists. My father was a forest entomologist, specializing in spruce budworm and sawfly and the like. I myself took zoology, botany, and chemistry in the last year of secondary school, which was at the time equivalent to the first year of university. I was very good at them, and if I had not been kidnapped by literature I would have become a biologist, just like my brother.... His son is a physicist. His other son is a materials engineer. So I know that if I make some humungous error of fact in the biological areas, the whole family will be down my neck.” (“My Life in Science Fiction” 156)

Getting the science right is a priority for Atwood: she is careful to distinguish her own speculative fiction from sci-fi fantasy fiction, in that the former deals with current scientific knowledge and the logical extensions thereof, whereas the latter is free to invent sciences for art (161–62). In *Cat's Eye*, the science is even more “right” than in her speculative fictions like *The Handmaid's Tale* or *Oryx and Crake*, in that it parallels more exactly the science practised by her own family. While clearly still working within the realm of fiction, the science in *Cat's Eye* is not purely artistic invention, and thus we can say that Atwood is in this case depicting “professional science,” which requires a certain amount of deference from non-scientist critics (as demonstrated by the author, who jokes that she “sideswiped” the science).

Readings that construct science as anti-feminist or racist, or that attempt to redeem science from these charges by divorcing it from its traditional ideas, not only risk reinforcing the disciplinary divisions between science and art but also risk missing the ethical and aesthetic messages of the novel, which is about recollection, perspective, forgiveness, reconciliation, and redemption. In *Cat's Eye*, the female artist and the male scientist are not adversaries but allies: “see-ers,” who construct maps, models, and “life-drawings” for understanding our existence. In Elaine's words, the scientists who are closest to her are like the boys in high school: “my secret allies” (221).

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Scientific Inheritances

It is important to remember that in *Cat's Eye* art evolves organically from science. Elaine is born into science; her father's entomological research determines how her family lives until she is eight. The Risleys are nomadic, living in intimate proximity with the outdoors; indeed, they live in the very laboratory in which her father does his work—the northern wilderness. This time in the north is depicted as a sort of Edenic prehistory to Elaine's life: a dark, leafy, earthy, timeless period in which she is more aware of the world around her than she is of her own existence. She is allowed to immerse herself in the physical realm. Long drives provide meditative space in which the future artist memorizes the shapes of her family's ears, gas station logos, and the patterns of the land around her. Visual observation and physical experiment drive her engagement with the world; language is muted and restrained, and the “wordlessness” of the forest is the backdrop of all activity (38, 193). This organic sensuality is the tenor of her father's biological work as well, seen even in such mundane activities as collecting caterpillars:

Stephen and I crouch, picking up the caterpillars, which are blue-striped, and velvety and cool, like the muzzles of dogs. We put them into the collecting bottles filled with pale alcohol. We watch them twist and sink.

My father looks at the harvest of caterpillars as if he's grown them himself. He examines the chewed leaves. “A beautiful infestation,” he says. He's joyful, he's younger than I am now. (28)

Science is joyful work in Elaine's family, and it is associated with the physical realm of the child—both by way of Elaine's own childhood and by way of her father's youthful enthusiasm. The children's play—collection, observation, experimentation, and imaginative theorization—merges with the scientific method. This Edenic biological realm is not all sweetness and light, however. Dr Risley's science includes both life and death. Yet things frequently conceived of as negative—darkness, silence, death, and corruption—have a purpose in the larger understanding of the world in which we live. The darkness reveals the Milky Way, insects under logs are objects of fascination, not fear, and death is instructive. Even a “classic infestation” is beautiful, to Dr Risley evoking “respect and wonderment mixed in with the sense of catastrophe” (89). The insects are “harvested” (a metaphor of generation) even as they die. His science, like the cat's eye marble, can reflect our “life entire”: a vision of life that encompasses death,

even taking in the war (537). Because of Stephen's "commando" war games, Elaine can "see in the dark," a cat's-eye skill that she will lose when she moves to Toronto (33). Elaine's statement on her scientific childhood is definitive: "I was happy" (26).

For Dr Risley, science clearly engages the emotional, the physical, and even the spiritual self along with the intellect. This spirituality is secular but real; it is invested in aesthetics, holism, and faith in the scientific ideal. For him, science is nutritive; in his dining table discussions he serves up his theories along with the meal. Even when his ideas spell doom and gloom for the human race, Dr Risley takes pleasure in the intellectual exercise (291–92). Besides, he reasons, if the world ends it will be because people have forgotten the virtues of science and "have gone in for politics and religion and wars instead" (334). Science, for Dr Risley, is "the only universal language." It is the language of numbers. For the classical scientist like Dr Risley, observational science liberates the individual, encourages critical thinking and compassion toward others, and builds bridges between diverse communities.

The idea of mathematics as the universal language is a critical part of the scientific ethos inherited by Elaine, and it helps us to understand the impact of language later in the story. Dr Risley is echoing Galileo, the godfather of observational science who considered the universe to be a "grand book" which was "written in the language of mathematics" (cited in Gould 13). Heisenberg repeated Galileo's sentiment in *Physics and Philosophy*: "[T]he concepts of the general laws must in natural science be defined with complete precision and this can be achieved only by means of mathematical abstraction" (172). For the classical scientist, this abstraction is liberating: "[D]ifficult as it is," Russell notes, "[it] is the source of practical power" (138). The classical scientist sees the mathematical "universal" language as connective precisely by virtue of the fact that it is *not* part of the everyday realm nor associated with our local languages which may in fact distance us, not only from one another but from the objects of our inquiry. Scientific language is a way to connect the object to the self, but its very abstraction saves the observer from a potentially dangerous conflation with the object.

Of course, the phrase "universal language" has a second meaning in reference to mathematics: it is actually a pun. For some theoretical physicists, the universe itself is a mathematical entity; it actually enacts a mathematical system. Although the "reality" of mathematics is a philosophical question extensively debated within the scientific community itself, for some scientists mathematics is, in a very real sense, the language of the

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universe. The *Cat's Eye* scientists—Stephen, in particular—seem to fit into this tradition. Stephen clearly envisions the creation of the universe as a mathematical expression. He echoes his biologist father: “[I]f the universe was created with a *fiat lux*, that fiat must have been expressed, not in Latin, but in the one truly universal language: mathematics” (446). Elaine says that this sounds like metaphysics, and although she means it somewhat ironically she is actually right. Stephen’s investment in mathematics as a means of expressing universal truths—words made of numbers—harkens back to their father’s scientific spirituality, within which Stephen still operates, and to which Elaine, in the present tense of the narration, is finding her way back.

As Jonathan Holden explains, mathematics is “the most visual, the least oral, the language closest to silence” of “all our written languages” (91). The idea of a language close to silence is important in *Cat's Eye*, which constructs silence as a virtue. Not only is silence associated with the northern wilderness, it is Elaine’s refuge from the manipulation of language used by Cordelia. Silence is (like science) associated with masculinity; Elaine’s dreams of boys are “wordless dreams, dreams of the body” and she “luxuriates in them” (336). But certain women in the novel—Elaine’s mother and the Virgin Mary, especially—are silent or close to it and are clearly positive characters. Elaine’s mother is so quiet she is almost invisible at points, but when she does speak (and when she does act) she says and does important things: she, like the Virgin Mary, brings Elaine back from the dead. The unnamed (wordless) Mrs Risley is the guardian of the past—of memory: she keeps the cat’s eye marble until Elaine is ready to see it again; she remembers the “bad time” when Elaine is still unready to do so (532). Like the rest of her family, Elaine’s mother tends to use language judiciously. Dr Risley can be chatty about science, but he is open and direct. Stephen is quiet, but when he does talk his tones are measured, his words precise—his postcards are extreme manifestations of his scientific concision (443).

But this does not mean that scientific language is always purely literal; metaphors and symbols frequently come into play, as Stephen demonstrates in teaching Elaine, but such figures of speech must be used selectively and precisely (Montuschi 280–81 and Hesse 161). Consider the delicacy of the difference between an object “existing” and “having a tendency to exist”—this demonstrates the poetry and the accuracy with which scientific language may be deployed as literary metaphor. Yet scientists are careful to place limits on metaphoric interpretation, as Stephen does in his example, specifying that this idea is true “at a sub-atomic level” and isolat-

ing the rhetorical nature of the problem (“you can’t even *say* ...,” “you can *only say* that ...”) (326). The rhetorical problems the scientist experiences in expressing the nature of reality are the result of a failure in translation between mathematical physics and non-mathematical languages; the atom can be described more accurately in math than in English. Ultimately for Stephen, non-mathematical languages become “imprecise”; Elaine realizes that “birthday” is a meaningless term for him because it refers to a socially determined temporal reference, not a scientific one (448).

When Elaine’s familial sensitivity to language—her faith in its accuracy—runs into the manipulative and false Cordelia, she is alienated from the beauty and symmetry that had once seemed to her to be linguistic possibilities. The ultimate expression of this comes when Cordelia perverts (in an expanded sense) Dr Risley’s entomology; in her manipulation of language, which she forces Elaine to articulate, he becomes a “bugger.” “I have betrayed, I have been betrayed,” Elaine reflects, using the same term that is used when Dr Risley’s faith in science is “betrayed” by his racist colleagues at the university who scorn Dr Banerji (182). And yet Elaine’s sensitivity to language does not invariably cripple her; it can become a creative force—as when she uses it to reinvent the expression “fallen women” in her painting *Falling Women*, connecting a social meaning to a scientific one (playing on Galileo’s thought experiments on falling bodies). Ultimately, for Elaine’s family a scientific approach to language does not alienate but detaches the user from her native biases and forges connections outward. Objectivity is connective; silence is informative.

Scientific Methods

By the time Elaine reaches adulthood, she has forgotten the scientific principles that informed her early life. Her focus has shifted from outward to inward, and the resulting lack of perspective obscures her view. From this vantage she sees herself exclusively as a victim, according to the false dichotomy that divides the world (as Cordelia once did) into victim and aggressor. She does this even as she develops her “mean mouth,” using language unscientifically—wielding words to confuse and abuse those who displease her, including Cordelia, Jon, and Josef. Her understanding of herself, other people, and the world around her is badly skewed. She is unstable, divided: afflicted by “diseases of the memory,” putting words in the mouths of others, seeing ghosts, and finding persecution everywhere. At this point, Elaine has no core self, no nucleus, as it were: she is “shedding matter” (16); she is “nothing, as if there was nothing there at all” (53). As readers, we can’t trust her analysis; she is unfair toward others, especially

the women organizing her retrospective, putting words and attitudes in their mouths (121). She doesn't even trust herself: she professes not to remember key events, or says she has "the wrong memory" (145). Elaine's ability to understand, to *see*, is compromised by the traumatic events of the past: the effect of this is to make her something akin to a bad scientist—she cannot process the data properly.

Judgmental and hypersensitive, she resembles Cordelia, who was obsessed with "measuring up." The phrase "measuring up" evokes not so much enumeration as a rigid accounting of value; furthermore, the "up" implies comparison to some forgone but unarticulated standard. It implies a subjective evaluation; in a social sense, this is exactly what "measuring up" is. Deery assumes Cordelia's idea of "measuring up" comes from her father and designates it as a "key male and scientific term" (229). But neither Cordelia nor her father is a paragon of scientific thinking—quite the opposite; they are disrespectful of science. When learning about the atom, for example, Cordelia dismisses the complexities of the science ("So?") in a way that forecloses any possibility for further inquiry ("To which there is no answer"). Her father, it seems, is similarly cavalier about science, as is suggested in the scene in which he discusses the girls' science courses with Elaine. His jocular generalities ("Ah, the atom ... what does it have to say for itself these days? ... 'Which one, indeed ... that's very good.'") clearly mask ignorance—he is trying to fake his scientific ability (335–36). Even the teenage Elaine knows more than he does, so any "measurements" coming from him or his daughter should be treated with suspicion. In fact, Cordelia's father's view of science unfortunately parallels the view of science held by some of the readers of the text. He seems to assume classical science to be static, absolutist, and repressive (there is only one atom), whereas the real scientists in the novel see it as evolving, flexible, and inspiring. The idea of "measuring up" is social, not scientific.

Atwood constructs Stephen and Dr Risley's empirical work not in terms of "measuring up" but in terms of simply measuring (counting) and, most importantly, in terms of collecting—caterpillars, marbles, butterflies, stars—an activity borne out of their love for the beauty of the natural world and involving a deep emotional connection. Stephen is gentle with the butterflies he collects, "He isn't interested in catching the butterflies and mounting them on a board with pins; he just wants to see them, identify them, count them" (195). Collecting and counting connect scientific realms; Stephen's transition from biology to astrophysics is seen as "collecting stars"—bringing them into his own personal realm, making them "his," and linking himself to the universe. Stephen savours the names

of the constellations: Elaine senses that naming is a process of “recognition” and “completion” for Stephen, not domination (140). The same might be said of his writing the universe out in pee, an act that has been misconstrued as an act of phallic dominance (Deery 235). In fact, it is a child’s act of connecting his own body with astronomical bodies, naming the one with the other: bodies, like stars, are “pure energy, solidified light” (*Cat’s Eye* 323). The jar of marbles that Stephen buries is called his “jar of light.” Light is the symbolic connection between the stars, the marbles, and the boy scientist. The physicist is linked with the child and the visionary—the see’er, who knows where the light is, who can collect the beautiful and illuminating aspects of life. Stephen’s jar of light is his secret heart, which he buries to protect from the world so he can go on to work in the field which brings him such joy, such personal fulfilment.

Elaine lacks Stephen’s objectivity; she has only one little marble, one fragment of light to see by, in her “heart”—which, figured by the plastic purse, is squashed, split, and opaque (537). She lacks his resilience, and she cares too much about how others see her and her art. It is only as she enters middle age and begins to learn (as her mother knew all along) not to “give a hoot,” that her artistic vision really takes off. Elaine’s paintings—montage-like assemblies of symbols, figures, colours, words, and objects—are essentially acts of collection (the novel uses a similar montage technique to narrate Elaine’s life). By the end of the novel she has collected enough of these moments from her past—her marbles—to fill her own jar of light. At the end, her sky is “filled with stars” which are “enough to see by” (567).

Elaine’s paintings are constellations of symbolic objects that she has isolated and abstracted from their original contexts in a way that bears strong resemblances to the scientific method. This process involves a certain level of objectivity—a sort of emotional distance from the things and people she portrays. But this kind of objectivity is redemptive, not oppressive. Elaine describes her paintings in terms reminiscent not only of her “black-hole” spells where she faints or becomes catatonic, but of the Kekulé-like dream state that allows a scientist/artist to isolate and truly see the object at hand:³ “I know that these things must be memories, but they do not have the quality of memories. They are not hazy around the edges, but sharp and clear. They arrive detached from any context; they

3 Kekulé was the chemist who discovered the structure of benzene, which he claimed came to him in a dream of snakes. This is not the only story of scientific dream-visions; Mendeleev apparently had a dream that enabled him to complete the periodic table; see Oliver Sacks’s commentary, 198 n. 4.

Elaine's myopic understanding of what happened to her at nine has obscured her understanding of her adult self.

are simply there, in isolation, as an object glimpsed on the street is there" (452). This process of summoning up the symbols of her past to be contained, isolated, and examined keeps Elaine at a safe distance from her own pain, so that she can calculate (slowly, over years) what really happened to her: "I have no image of myself in relation to [these things]. They are suffused with anxiety, but it's not my own anxiety. The anxiety is in the things themselves" (ibid.). This level of objectivity is not restrictive, but liberating; as with the universal mathematical language, abstraction will eventually lead one to greater comprehension. There is a certain coldness here, but it is not negative. This type of coldness is metaphorically figured in Elaine's dream of the "brilliant and glassy" cat's eye marble falling into her out of the sky, "without hurting, except that it's cold" (196).

In reference to the domesticated scientific wrestling between Dr Risley's biology and Stephen's astrophysics about the end of the world, Elaine's cryptic comment is, "Whoever cares the most will lose." This reflects the different nature of the two sciences in their proximity to human existence. Stephen's "long-range view" dwarfs biological destiny in cosmic destiny, and Stephen himself is more abstracted from the messy world of human interaction than is his father. There is emotional distance but also scientific vision in his position. While the idea of "caring less" may fit into some notion of a compassionless, empirical science envisioned as oppressive, in actuality Elaine desperately needs (and in fact yearns for) objective distance. Coming in too close (like she does with the mirror when putting on her makeup or as happens when one stands too close to an oil painting) blurs one's vision. Elaine's myopic understanding of what happened to her at nine has obscured her understanding of her adult self. She needs to pull back to a greater scale, to consider (collect) other contexts and perspectives, in order to get accurate readings. This does not negate her immediate perspective (just as Dr Risley's predictions are not wrong in a biological sense—and we must note that Stephen does not refute them, he recontextualizes them), but it incorporates that perspective into a larger and more complex calculation, where the truths are farther away, though no less real.

This "pulling-back" process begins when Elaine survives falling into the river. When she returns to the girls she is colder (symbolized by her near-hypothermia), and not caring gives her some protection: "I don't know and I don't care" is her first response to their attempt to re-ingstate the bullying. Unfortunately, Elaine's distance is only partial at this point. It allows her to stop the bullying, but she does not gain sufficient distance to see why that bullying happened in the first place. Nor does she understand

the complex—and often shifting—relationship between aggressor and victim. While her universe is expanding and the girls are beginning to recede, “growing paler and paler every day, less and less substantial,” Elaine is not looking—not observing: “I hardly hear them any more because I hardly listen” (261). This moment is divided—both a victory and a failure—as the chapter title “Half a Face,” which immediately follows this passage, indicates. Elaine has found a way to survive, but only at the cost of her understanding, and this compromises her science of self. It is a sort of wilful ignorance, and in the end its answers are limited and unsatisfying.

As an adult, Elaine has to learn to observe the broader universe of human interaction and to recalculate her position accordingly. She has to begin to reconcile the intimate pain of her personal perspective (identified here with her father’s biology—dissections and life drawings) with the abstracted peace of a universal perspective (identified with Stephen’s physics—stargazing, collecting, and computing). Like quantum mechanics and astrophysics, these two perspectives coexist with some apparently contradictory laws. Nevertheless, both fields have some parts of the answer, and this is closer to the truth than is a vision which excludes either one. Elaine’s retrospective presents a “unified field *theory*” in that it is still highly speculative—Elaine realizes that there is much she cannot know. As Stephen discusses in his lecture, in the face of the unknown, theory is “our only guide” (445). The ultimate unification of the two sciences and of Elaine’s divided self, really, is still out of reach (like Cordelia remains out of reach in the novel). Nevertheless, there is some scientific progress in that Elaine has begun a process of collecting, naming, and mapping in her art that promises better understanding in the long term.

The Art of Science

Elaine arrives at the “scientific” style in which she feels at home as an artist only after rejecting a series of ideas about art presented to her by others. While her decision to become an artist is an almost seamless shift from her interest in biology (occurring in the middle of her Botany exam), her meticulous scientific productions do not seem to appeal to the artistic community at first. Elaine is subjected to the condescending and sexist opinions of her art teacher, Josef, as well as her husband, Jon. The character of Josef is closer to the conventional construction of a patriarch than any scientist character in the novel; he sleeps with his young female students, savouring the control that he thinks he has over them. He is dismissive of Elaine’s scientific style—her biological life drawings—preferring “passion” to accuracy (366). When Charna interrogates Elaine about male oppres-

sion in her rise as an artist, Elaine realizes that Josef would “fit the bill for her” as the required patriarch, although she refuses to offer her experience with him up for media fodder (120). This is in part due to the more complex and compassionate view of the world that she is just beginning to gain—a view that sees the victim in the oppressor. Josef’s art, however, is emblematic of the sort of blurred vision that Elaine detests and mistrusts: he constructs cloudy, imprecise images of young women he desires, which are so vague as to be interchangeable. Josef’s patriarchy is antithetical to the scientific principles Elaine admires: it is fuzzy, subjective, and untrue, and it threatens to envelop her. Josef’s use of language is similarly slippery: he does not understand that to “finish” someone may not be a positive thing (367), yet of course this is exactly what he tries to do to Elaine, as he attempts to control her and her art. But even this patriarchy is a weak force in the novel: Josef is mostly pathetic; if there is any evil in him it is in that he manipulates his status as victim as a tool to control young women, spinning sad tales of loss to Susie and Elaine as part of his seduction. In aggrandizing his victimization, Josef becomes an oppressor (albeit more of Susie than of Elaine, who maintains a certain emotional distance from him). In this respect, Elaine is uncomfortably close to him, and close to being the oppressor as much as the oppressed (note her brutal comment on Susie’s botched abortion: “*It serves her right*”) (430). When she returns to a more objective stance, however, she is able to find some compassion not only for Susie and Josef, but also for Cordelia.

Josef is not the only artist who is portrayed negatively in the novel. Jon, less pathetic than Josef, is nevertheless so insecure that he cannot adhere to a single artistic vision, switching styles in a desperate attempt to keep up with whatever is considered current. He can’t hold his own against Elaine, either artistically or in marriage, and the fragmented bodies littering his studio reflect the fragmented nature of his artistic life. His blurry, brittle identity is similar to the artist version of Cordelia—the young actress in her late teens and early twenties, whose body keeps changing shape, who flakes and flutters through “bit parts,” who merely parrots the words of others (but without the conviction she had when she parroted her father; Cordelia inhabits her own role less and less as the novel progresses). Once again, Stephen demonstrates true vision when he observes that Cordelia is atomic—she only has a “tendency to exist.” He means it metaphorically, but by the time of Elaine’s retrospective, his words are (typically) absolutely true: Cordelia only exists in Elaine’s mind; therefore she is everywhere (to Elaine). Once again, the scientist’s language comes closer to the mark than the artist/actor’s linguistic “play.” Much of Elaine’s development as

an artist will come from her reclaiming of the scientific aesthetic: using hard-edged realism (her glossy peaches), highly abstracted symbolism (the cat's eye, of course, and all the other objects in her paintings), clarity (the crisp, unblurred colours), transparency (the veneers of the egg tempera), and light (the reflective quality of the work, both literally, in the mirrors Elaine depicts, and metaphorically). Her art is a series of complex formulae that combine in the retrospective to produce an even more complex calculation. While perhaps not producing a simple "answer," this system of calculation brings her closer to the truth.

The highly symbolic nature of Elaine's work reflects her return to the symbolic nature of scientific language: the domestic objects that her art isolates are "universal" in that they are personal objects from her past—her universe—but they are also universal in their banality. With the exception of a few unusual objects (like the budworm eggs, which stand as a secret code to her allies, the scientists) the objects are accessible to others, and this accounts for her professional success. Unfortunately, some viewers like Charna come to the work from an entrenched political perspective and, as such, employ the symbols to dubious ends, miscalculating their significance. Elaine makes it quite clear that she considers Charna's formulae awkward, inelegant, and just plain wrong: "If I hold my breath and squint, I can see where she gets all that" (547). This joke has given some critics trouble; they sometimes attempt to evoke—by way of those quantum ideas of "uncertainty" or "relativity"—an ethical relativism that accepts all possible interpretations as correct (Hite 147, Sharpe 185). But the science does not really work this way, as discussed above; quantum theories have not absolved us of the need for clarity, accuracy, or precision, nor do they mean all answers are equally correct. There are good interpretations of data, and bad, and Atwood seems to be taking a hard line on this: we must get the science right. To suggest, as Sharpe does, that Elaine's comment means that "she attempts to take Charna's perspective into consideration" asks us to ignore the obvious irony of the statement, which is akin to neglecting to include all the data provided (184). Jody, Charna, and Andrea are so convinced that Elaine is a "feminist" painter that they can come dangerously close to being offensive: Charna's construction of Stephen as "juvenile" and representative of war (which sounds a lot like Hite's reading cited above)—jars with our own experience of his character (549). The gallerists, like Cordelia, want to "play director"—to dictate Elaine's role to her. They err in being too absolute, too certain.

When Atwood does bring in ideas of uncertainty and relativity vis-à-vis the nature of interpretation, she does not suggest an absolute ethical

relativism but a much more contained method for dealing with change and fluctuation that reflects how these realities are dealt with within science. Uncertainties take the form of variables that Elaine must recognize in her own life and work in order to read her own universe: the fact that her position has changed since childhood and she is no longer (nor was she ever, solely) the victim; the fact that the motivations of others remain opaque. The interpretation that is important at the exhibition is not the gallerists' but Elaine's.

When Elaine says she can “no longer control these paintings, or tell them what to mean,” she is reflecting how their meaning has changed for *her* since she first painted them: Mrs Smeath is no longer purely evil; Cordelia has become a ghost (551). Really, it is not other people with whom Elaine's art communicates—it is herself, her lost, “twinned,” child-self that was kept at age nine, sent into space like the astronaut twin of Stephen's analogy of special relativity, while another part of her aged on earth. She has always been too aware of how others see her; now, her paintings allow her to consolidate her vision and see her self—which was fragmented and scattered by Cordelia's abuse—“entire”: “I have said, *Look*. I have said, *I see*” (545). Paradoxically, and yet wholly scientifically, this move toward unification means being *less* certain about some things; this is why the painting *Unified Field Theory* includes the Virgin of Lost Things. Some things have gone into a black hole and cannot be retrieved—including Cordelia and her motives:

She will have her own version. I am not the centre of her story, because she herself is that. But I could give her something you can never have, except from another person: what you look like from the outside.... We are like the twins in old fables, each of whom has been given half a key. (554)

Recognizing multiple sources of data—including multiple observer positions and boundaries of knowledge—is not the same as destabilizing the very possibility of truth. Perhaps it is Charna and Andrea's certainty, amongst other things, that is unscientific and oppressive; instead of asking Elaine what her art is about, they tell her. The true scientist recognizes the limits of her vision, which these characters do not. As a result, their readings are found inelegant, and ring false. It can be more productive to come *closer* to the truth with a beautiful theorem that still contains some mysteries than to succumb to the temptation of an awkward formula that gives us the *illusion* of certainty. These are the ethical and aesthetic lessons of science that Elaine learns through her own art.

Elaine's retrospective exhibition accomplishes two things: it makes her remember and it allows her to begin to solidify her fragmented and blurred identity. At the beginning of the novel, Elaine is not a "person of substance," as she feels she is supposed to be in the middle of her life, and this is not a positive thing for her: "I'm shedding matter, losing molecules, calcium from my bones, cells from my blood.... With all this lightness I do not rise, I descend. Or rather I am dragged downward, into the layers of this place as into liquefied mud" (16). Mentally, she is split between her adult self and her nine-year-old self, who pulls her own skin off in an excruciating image of the psychological fragmentation she has suffered. Through the process of viewing her art and remembering, she is able to calculate the distance between herself and Cordelia. Elaine finally recognizes that the "wrongness, awkwardness, weakness" she felt "are not [her own] emotions any more. They are Cordelia's; as they always were" (564). When she turns to look at what she thinks will be her child-self on the bridge, she sees nine-year-old Cordelia and sends her home. At this moment, Elaine is singular, not fragmented. She grows up, becomes the adult, becomes "the older one ... the stronger," and places Cordelia where she belongs—in the past (564). She regains her cat's eye vision and defines her boundaries. She unifies her "nine years old forever" self and her adult self and, in so doing, allows Cordelia to dissipate. While this unification is momentary (Elaine is not "finished" in the narrative—her retrospective marks the *beginning* of her future work of synthesizing her experiences), it stands as a glimpse of the truth she is seeking. It is a vision of where her new observations, calculations, and theories will take her.

Muses: The Scientific Trinity

Amongst the things (re)collected in Elaine's retrospective exhibition is her relationship to science and to scientists. The techniques, materials, and subjects of her art all draw on the ideals of classical science, as we have seen; like her brother, Elaine comes to articulate her father's scientific idealism. In fact, Elaine's paintings are elegiac in regards to the classical ideal of "Science" pursued by Dr Risley, Dr Banerji, and Stephen. The scientists are portrayed as heroes, albeit somewhat tragic ones: while each of these men suffers a disturbing violation of his vision of science as it is corrupted by "politics and religion," they persist in tending the flame of the scientific ideal. Atwood, who believes that "science is neutral," constructs an artist who takes it upon herself to preserve the scientist's guiding light in her paintings. In so doing, she links the aesthetic and ethical vision of science to that of art.

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She unifies her
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to dissipate.

In the section of the novel entitled “Unified Field Theory,” Elaine describes five new paintings in her show—paintings which have been recently produced and (we assume) not shown before. They are larger than her previous canvases, and she describes them as though seeing them for the first time herself. Of the five paintings, three of them contain portraits of the scientists in the novel, indicating their importance in this collecting of Elaine’s past. The scientists are presented as a healing trinity against the three little girls who abused Elaine. They are inspirational figures, a fact that Elaine makes clear by including a scientist in her painting *Three Muses*. Here, Dr Banerji is depicted with Mrs Finestein (who loved colour) and Miss Stuart (who loved art). He holds the slide of the spruce budworm eggs that he shared with Elaine when he encouraged her artistic vision by supplying her with samples to draw: “He brings me slides he thinks I would like to see and offers them to me shyly and eagerly, with a conspiratorial giggle, as if we were sharing a delicious esoteric secret, or something religious” (333). Here, he is not the colonized subject defeated by the scientific hierarchy (Deery 235), but the aesthetic visionary. Both Deery and Hite consider Dr Banerji “feminized” in relation to an empiricist and patriarchal science (Deery 235, Hite 146), but this assessment unwittingly replicates Dr Banerji’s subjection. It reinforces the racist idea of the unmasculine native and ignores his agency and contribution to science and art—qualities for which Elaine awards him the status of muse.

Dr Banerji certainly suffers from racism, but this is the result of political and social prejudice in academia, not the result of science itself. This point is made clear by Dr Risley, who is “betrayed” by the racism of his colleagues at the university:

“They wouldn’t promote him,” says my father. There’s a lot behind *they* (not *we*), and *wouldn’t* (not *didn’t*). “He wasn’t properly appreciated.” I think I know what this means. My father’s view of human nature has always been bleak, but scientists were excluded from it, and now they aren’t. He feels betrayed. (386)

Dr Risley *has* been betrayed by his fellow scientists who were more invested in maintaining social and political hierarchies than appreciating Dr Banerji’s science. These failed scientists will never, for Dr Risley, be part of the “we,” those who search for the beautiful, complex truths of the universe. It is commonly observed by scholars of the novel that *Cat’s Eye* is largely about the destructive process of socialization; what is missed is that science (or, more accurately, Science) is just as much a victim of

ugly, soul-destroying social “values” as is Elaine herself. This is where the analyses of Foucault, Harding, and Haraway are pertinent, as they reveal the corruption of an ideal in a socialized context. But Atwood has seeded an ethical challenge to perspectives that construct science as merely the sum of its cultural abuses: if science can never rise above its corruption by “politics and religion,” then are other victims of cultural oppression equivalent failures? Do we then read Dr Banerji, Elaine, or any other victim of abuse as permanently defeated? Atwood, like the fictional scientists in her novel and many real scientists today, realizes that the tools of science are vulnerable to misuse. But like Dr Banerji, Atwood asks us not to give up the beautiful ideal: in *Three Muses*, Elaine recognizes the scientist as an artist who is an outsider vulnerable to abuse, like Mrs Finestein and Miss Stuart, but who refuses to let social oppression blind him to the beauty of his work.

In the painting *Picoseconds*, Dr Risley is preserved with his twin-wife in the wilderness where his real scientific work was carried out, uncorrupted by racist academic politics. In this painting, Elaine’s parents are presented in a “different style” than the rest of the scene—a landscape done in the heavy oils of which Elaine is usually so suspicious. She paints her parents, however, in a separate section of the canvas using her usual crisp, hard-edged style—“as realistic as a snapshot” (547). In memoriam to his scientific principles, Elaine allows her father to exist in the clear-eyed bubble of the Science that he loved, while acknowledging the darker, blurrier, “heavier” world in which he worked. She portrays him cooking, in a domestic scene, illustrating how his scientific work merges with his personal relationships, especially those with his family. “Picoseconds” refers to the first instants in the life of the universe, and this painting of her scientist parents in the north reflects the universe that Elaine was born into; science is part of the foundation of her existence—her universal and primeval truth.

The most powerful painting of a scientist is *One Wing*, the portrait of Stephen, where Atwood presents a deeply moving commentary on the role of the scientist in *Cat’s Eye*. Stephen is depicted as suspended in mid-air, along with the moths and planes that so fascinated him as a child. The plane, the moth, and the man are presented in a triptych, a form used commonly in medieval and renaissance paintings of divinity and which recalls the “trinity” of scientists in Elaine’s life. Like other divines, Stephen is made eternal here, metaphorically placed in a dimension where the laws of earthly existence no longer apply. On the canvas he is a child and a man, flying and falling, alive and dead, all at the same time. The painting

is clearly a reflection on his death, but it also captures him at the beginning of his life, as a child. In collapsing these two points of his existence Elaine is also playing on the twin theory that he taught her—the boy and the man are like the twins who aged at different rates. The painting also demonstrates the synthesis between biology (the moth) and physics (the plane), connecting Stephen to both scientific traditions.

This painting speaks to the redemptive possibilities of science. Stephen dies in an act of terrorism, but even in that moment Elaine imagines him as balanced and serene. He dies, but he is not defeated: he faces the worst sort of abuse that one person can inflict on another—murder—with peace. In a book that is about victimhood, Stephen (as the only one who actually dies at the hands of others) is the ultimate victim, and yet he is not abject. By the time he dies, Elaine is beginning to bring his ideas into her art and her life more broadly. She is capable of understanding that without detachment, there is “too much justice”: an eye for an eye (523). Elaine understands that Stephen’s world came to an end because, as their father feared, scientific principles were abandoned for “politics and religion.” She even tries not to think of it as murder, difficult though that is. She envisions her brother’s death as sad and painful for herself but not necessarily for him; he simply “enters the past,” a dimension to which he always wanted to travel (528). In *One Wing*, he is flying at the moment of his death, “faster than the speed of light”—fulfilling his childhood dream. By imagining her brother’s death as a fulfilment of scientific objectives and childhood passions, Atwood is clearly constructing science as redemptive in the most traditional sense. Science saves Stephen; it is his Virgin Mary, his cat’s eye, his kingdom of heaven within him. It brings him home. There is even an aesthetic quality to his death encoded in the central symbol of the novel; there is a Cat’s Eye Nebula (NGC 6543) which is considered one of the most complex and beautiful nebulae. A nebula is a dying star. The painting acknowledges Elaine’s loss; without her brother-twin she is precarious, singular, flying on one wing, remembering her father’s toast to family and community, “You can’t fly on one wing.” But Elaine does fly, and *One Wing* is also her “prayer,” her way to “assuage pain” (549), memorializing Stephen’s “cheerful” childhood song, “Coming in on a wing and a prayer.” The painting commemorates Stephen’s scientific gifts to his artist sister: his objectivity, his optimism, and his vision.

Feminists for Science

Cat’s Eye does not attempt to recast science as a mere social construction; rather, it returns to the classical ideals of science—truth-seeking

and rational inquiry—even while acknowledging the vulnerability of these ideals to social and political corruption. This classical science furnishes its practitioners with eyes to see beauty in the world’s mysteries and complexities, even those that at first appear unsettling. It encompasses death (the dissected specimens), infestation (Dr Risley’s caterpillars) and contradictions of logic (backwards time), uncertainty (the Heisenbergian principle), and the unknown (the black hole singularity). These complexities do not overthrow the framework of science, nor do the scientists deal with these phenomena by seeking to conquer or deny them. Rather, these variables may be addressed *through* the framework of classical science; acknowledging them paves the way for greater clarity and understanding. As Stephen points out, from the perspective of quantum mechanics, the reason that we can’t walk through walls is that we don’t currently “know enough about matter.” This is a far different thing from saying that matter is unknowable or that it doesn’t actually exist apart from our own perception of it. In the face of what we can’t observe directly, like the black hole, the creation of the universe, or Cordelia’s motives for abusing Elaine, “theory is our only guide” (445). But theories must be constructed responsibly, with respect for what we *do* know—for the laws of science that have been established. We cannot simply abandon them for all manner of relative “truth.” We cannot “forget” what we know, as Elaine does up to the point of her retrospective. Doing so produces a false result—an inelegant and ultimately unsuccessful proof—as when Elaine does when she remembers herself as an eternal victim of Cordelia. At the end of the novel, Elaine’s more perceptive theory—that Cordelia’s behaviour resulted from her being “the unloved one”—does not answer all of our questions, but it is closer to the truth.

Some literary critics may be guilty of a similar sort of “forgetting” in their calculations of the relationship between science and feminism in the novel. Like Elaine does before her eye-opening retrospective, these readers may be clinging to a perspective that assigns the roles of victim and oppressor too absolutely. While Atwood clearly acknowledges gender divisions (Elaine, infuriated by the artistic establishment’s bias toward “dead foreign men,” admits her attempts to reject feminist analyses altogether leave her on “dubious ground”) (14, 121), the nature of who is oppressing whom in *Cat’s Eye* does not fit into some basic feminist assumptions: however uncomfortable it may be, we have to face the fact that in the immediate sense Elaine suffers more at the hands of other women than she does at the hands of “the fathers.” I can accept that these fictional female characters are acting out of a subjected position in a larger patriarchal system, but

While in *The Handmaid's Tale* and other texts Atwood might have joined in on these social critiques of science, in every essential way in *Cat's Eye* science retains its classical values of objectivity, rationality, and empiricism.

that should not rob them of agency nor absolve them of responsibility. Nor does it follow that all “male” values and traditions—including scientific empiricism, if we view it as such—are part of an oppressive patriarchy. Atwood makes the issue more complex; she portrays the virtues of classical science while still acknowledging the fact that it is largely a male domain at this point in time. But she suggests that the reason there are “no girls” in the building is analogous to the reason for Dr Banerji’s exclusion from academia: these are perversions of the scientific ideal, not extensions of it. The classical science in *Cat's Eye* is egalitarian, organic, and artistic *in the very tradition of the scientific method*; this aligns it with feminist values, even while the scientists that practise it are neither female nor (overtly) feminist.

Fragmentation, hyper-subjectivity, and relativism are all viewed with extreme suspicion by Elaine because they are more of the same sort of arbitrary manipulation of truth to which Cordelia subjected her: the manipulation that made her believe she was “nothing.” She is even dismissive of light-hearted postmodern wordplay like “Sub-Versions,” seeing it as a sign of cultural banality and artistic immaturity that she has moved beyond: “one of those puns that used to delight me before they became so fashionable” (19). (Early drafts of this passage were more vehement: “An embarrassing name, I hate those coy puns” [Box 100, folder 17].) While Atwood herself is clearly more comfortable with contemporary cultural theories, she is challenging us with her prickly Elaine. While in *The Handmaid's Tale* and other texts Atwood might have joined in on these social critiques of science, in every essential way in *Cat's Eye* science retains its classical values of objectivity, rationality, and empiricism, and it is still flavoured male (but not patriarchal). Atwood is not satisfied with arguments that conflate abusive or oppressive behaviour with men, with science, or with male scientists. Elaine’s oppression came at the hands of unscientific females, and she herself absorbed many of their opinions—even their voices—as she grew up. The retrospective process of getting some distance and seeing the evidence anew means that Elaine must re-attach herself to the ideals of empirical science practised by the men in her family. This view produces a more challenging reading than one that tries to make science over into “science for feminists.” By keeping classical science “male” (an accurate reflection of an unfortunate current social reality) but not patriarchal, Atwood asks us to recalculate some of our assumptions about gender, as well as about science.

The novel asks us to detach “classical science” and its methods from a troubled social history and to reclaim those methods for artists, human-

ists, and feminists. There is, the novel suggests, nothing *inherently* sexist, racist, or colonialist about counting, naming, and mapping—and, indeed, there is much that is beautiful about these activities. Mis-attributing the oppressive results of western social politics to the principles of science actually reinforces those racist and sexist politics by allowing such views to have the final say and by foreclosing the possibility of an ideal science that is “dispassionate and without bias” (334). Indeed, as Atwood herself points out (“Against science, as opposed to what?”) we can ill-afford cynicism; if we give in to the idea that all science is merely the sum of its oppressive corruptions, we leave no place for science in the world at all. Some manifestations of scientific inquiry may well involve “controlling and subduing” the object of inquiry as some critiques allege (Deery 235), but other uses of science are liberating and inspired. The subjection of women and non-European races attributable in part to the diversion of science through patriarchal racism has been challenged repeatedly by more enlightened scientific inquiry—inquiry that takes as its starting point an investment in empiricism and objectivity, just as Dr Risley advocates.

Not only does *Cat's Eye* remind us of the shared interests of classical science and feminism, it reminds us of the long-standing alliance between science and art, which has become obscured in political debates that divide the world into male and female, scientific and artistic, linear and dimensional, rational and emotional, empirical and aesthetic, metaphoric and literal. As Stephen J. Gould has pointed out, such entrenched dichotomization is intellectually and culturally dangerous to all parties (69–112). Atwood seems to be presenting a formula that breaks the polarities that too often construct scientific, artistic, masculine, and feminine perspectives. There are parallels here to the biology of Dr Risley that comprises both “wonderment” and “catastrophe”: the dead-alive symbolism in the novel, the merging of different time spaces, the artistic representations of dissected bodies, and other symbolic constructions in the novel collapse dichotomies to produce “life entire.”

What is especially challenging about Atwood's construction is that she does not ask science to change its nature insofar as it can be cold, hard-edged, distant, and even connected to death. Instead she recognizes the aesthetic and ethical possibilities of these qualities. In a phrase that reminds us of Dr Risley's caterpillar collection, Atwood calls the creative, enlivening process of writing “negotiating with the dead.” In her book of that title she suggests that the artist/writer has to be “cold-blooded” at times (35). Scientific methods and meanings—from dissections to dimensions—also negotiate with the dead. Her own writing is implicated, of

course, as her famously cool tone produces sufficient distance between the reader and Elaine that we can eventually, paradoxically, have an empathetic response to this difficult character. Like Stephen, who is a “deadly” marble player (he has perspective and therefore can take risks to win his jar of light), the artist/writer has to care a little less in order to *collect herself*, so to speak. She must reconcile with the thin, hungry dead like Cordelia because, as part of “life entire,” they are personal and artistic resources within us: “We are the dead” (142). With the physicist’s universal perspective, the complexities of Elaine and Cordelia’s relationship can be seen, and only then can Elaine forgive Cordelia and herself. Thus science provides powerful ethical and aesthetic models for both feminism and art: Elaine re-collects these allies through her retrospective and uses them to *see*. In the end Elaine is in flight, albeit on “one wing” but also “assuaged” by her recollection of the past. There are no simple victories here, but there is some redemption in what Eleanor Cook calls the “peculiar freedom” of artists and scientists (49). It is the freedom of the cat’s eye: a child’s toy made from a mineral, a dying star, an organ that sees in the dark. The cat’s eye can take the old, distorted light of science and use it to see by.

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